GenePaint.org

Derk Geene
Harmen van der Spek

Outline

- What is GenePaint.org
- In situ hybridization (ISH)
- Data generation and processing
- Data storage
- Querying the database
- Data visualization

About GenePaint.org

- **Representing gene expression patterns in mice**
- Max Plack Institute of Experimental Endocrinology
- Baylor College of Medicine, Department of Biochemistry and Molecular Biology
- According to article: GenePaint.org: An atlas of gene expression patterns in the mouse embryo

About GenePaint.org

In situ hybridization

- Pairing labeled probe with mRNA
- Labeling indicates amount of mRNA
- Amount of mRNA indicates amount of gene expression
- All done on cells, not on isolated material

Data generation

- Non-radioactive ISH on frozen sections of mouse embryos and mouse brains
- Labeling technique makes 5 mRNA copies per cell visible (estimate)
- Section of E14.5 embryo requires 195 exposures, each 500x668 pixels, 24 bit-color.
- After cropping image 100-200 MB

Data processing

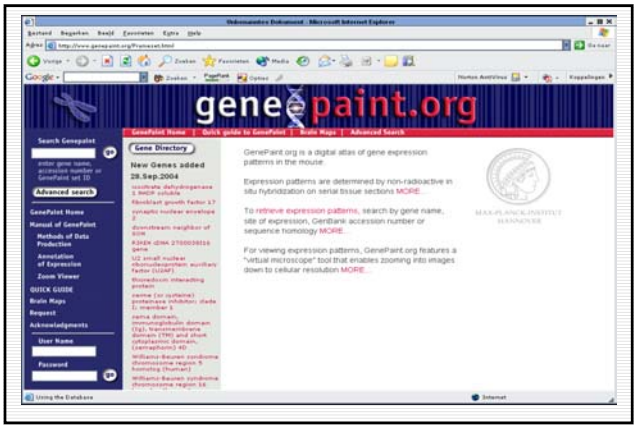
- Meta data:
  - Specimen identifier
  - Sequence of template
  - Hybridization conditions
- Quality control
  - Template sequence validation
  - Tissue quality assessment
  - On failure, data are recollected

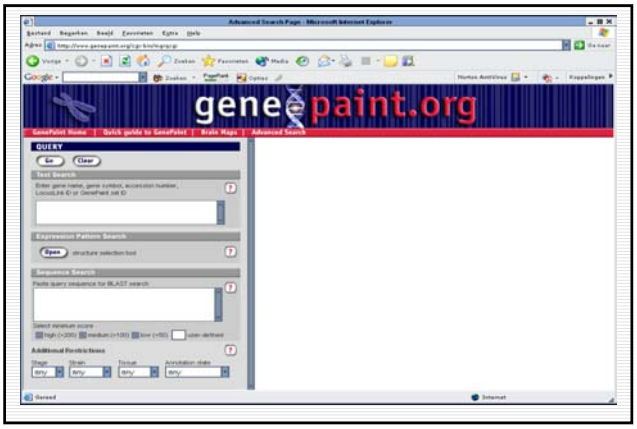
Data storage

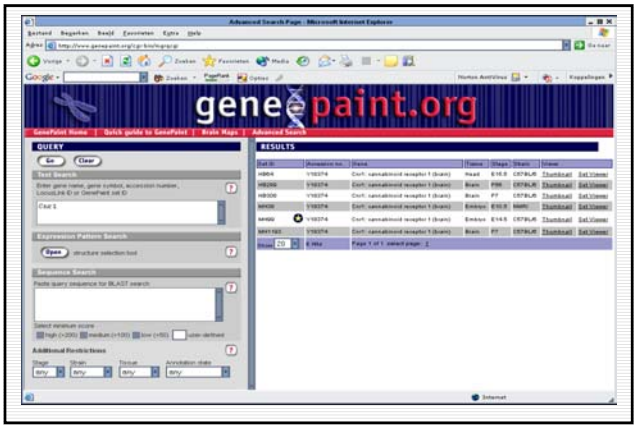
- Relational DB2 database
  - Public part
  - Private part: Content management system
- Nomenclature
  - LocusLink (Results link to this site)
  - Mouse genome database

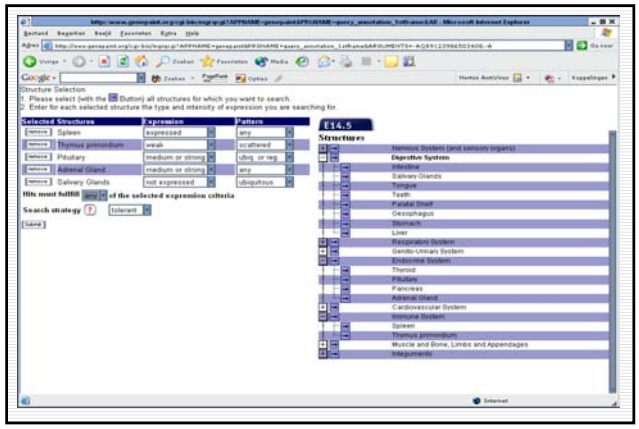
Querying genepaint.org

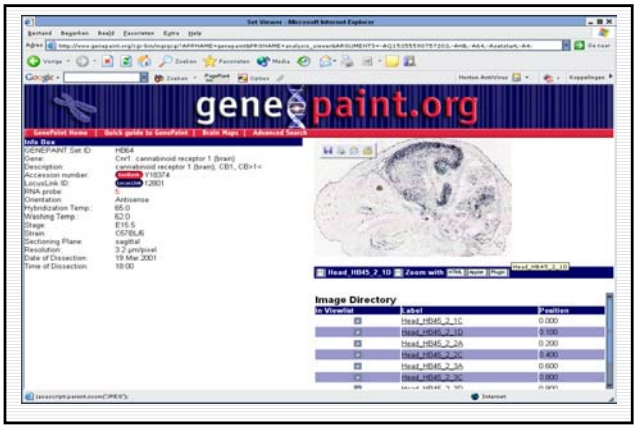
- Public component
- Laboratory management system
  - Document experimental steps
  - Parameters for dataproduction
- Retrieving and viewing gene expression patterns

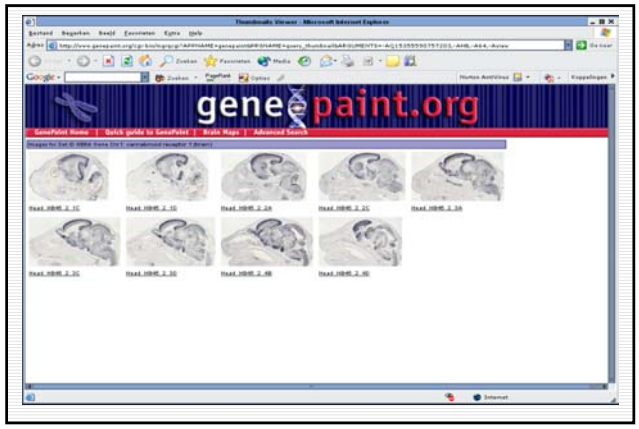


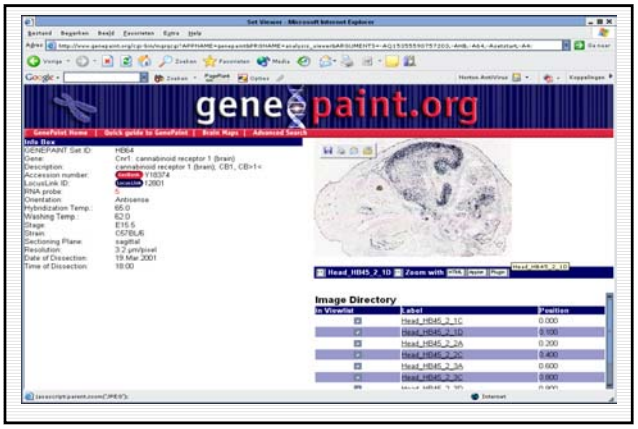


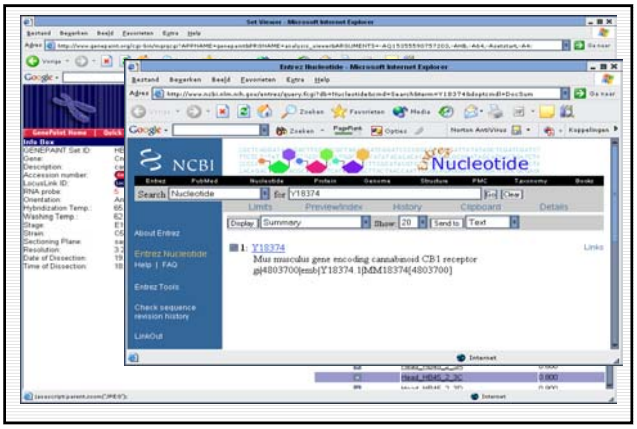


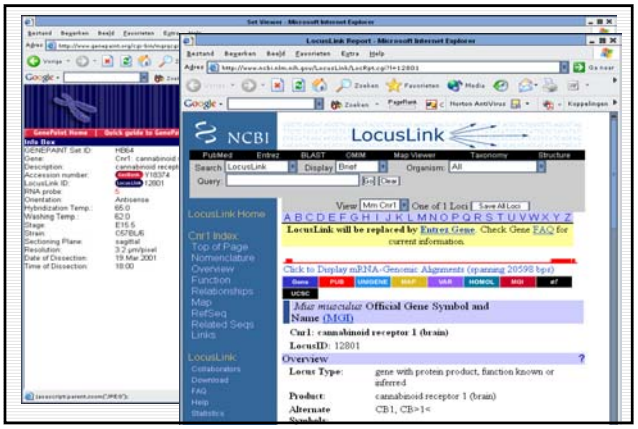

Structure Selection
1. Please select (with the Button) all structures for which you want to search.
2. Enter for each selected structure the type and intensity of expression you are searching for.
Selected Structures
Expression
Pattern
Spleen
expressed
any
Thymus primordium
weak
scattered
Pituitary
medium or strong
ubiq. or neg
Adrenal Gland
medium or strong
any
Salivary Glands
not expressed
ubiquitous
Hits must hit/not hit any of the selected expression criteria
Search strategy
tolerant
submit
E14.5
Structures
Nervous System (and sensory organs)
Digestive System
Intestine
Salivary Glands
Tongue
Teeth
Parabal Shelf
Oesophagus
Stomach
Liver
Respiratory System
Genito-Urinary System
Endocrine System
Thyroid
Pituitary
Pancreas
Adrenal Gland
Cardiovascular System
Immune System
Spleen
Thymus primordium
Muscle and Bone, Limbs and Appendages
Integuments

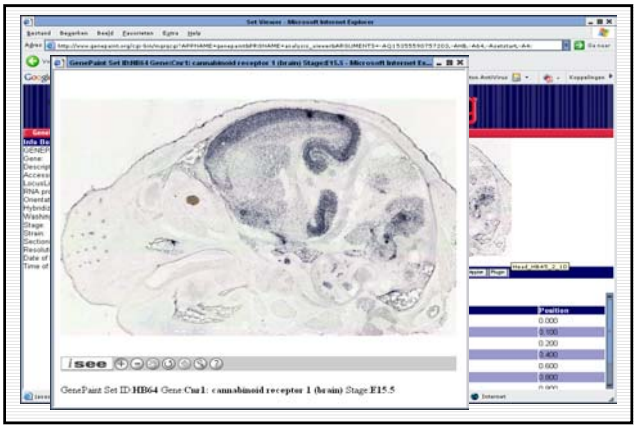

genepaint.org
GenePaint Home | Quick guide to GenePaint | Brain Maps | Advanced Search
Info Box
Image Directory
In ViewSet
Label
Position
Head_HB45_2_1C
Head_HB45_2_1D
Head_HB45_2_2A
Head_HB45_2_2C
Head_HB45_2_3A
Head_HB45_2_3C

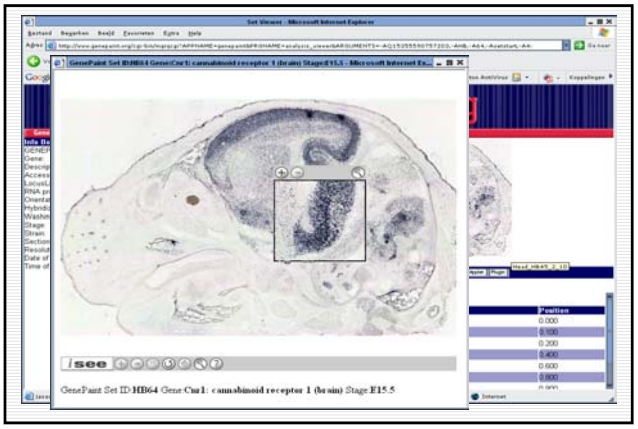

genepaint.org
GenePaint Home | Quick guide to GenePaint | Brain Maps | Advanced Search

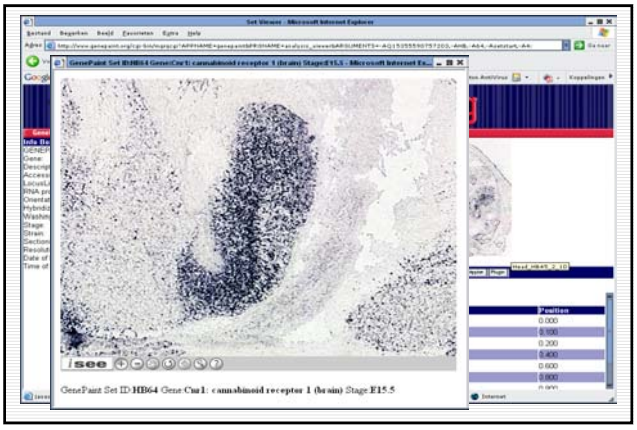

genepaint.org
GenePaint Home | Quick guide to GenePaint | Brain Maps | Advanced Search
Info Box
Image Directory
In ViewSet
Label
Position
Head_HB45_2_1C
Head_HB45_2_1D
Head_HB45_2_2A
Head_HB45_2_2C
Head_HB45_2_3A
Head_HB45_2_3C


NCBI
Nucleotide
Search Nucleotide for Y18374
1: Y18374
Mus musculus gene encoding cannabinoid CB1 receptor
gi|4803700|emb|Y18374.1|MM18374[4803700]


NCBI
LocusLink
LocusLink will be replaced by Entrez Gene. Check Gene FAQ for current information.
Mus musculus Official Gene Symbol and Name (MGI)
Cnr1: cannabinoid receptor 1 (brain)
LocusID: 12801
Overview
Locus Type: gene with protein product, function known or inferred
Product: cannabinoid receptor 1 (brain)


GenePaint Set ID:HB64 Gene:Cnr1: cannabinoid receptor 1 (brain) Stage:E15.5


GenePaint Set ID:HB64 Gene:Cnr1: cannabinoid receptor 1 (brain) Stage:E15.5


Position
0.000
0.200
0.400
0.600
GenePaint Set ID: HB64 Gene: Cnr1: cannabinoid receptor 1 (brain) Stage: E15.5